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AAEON Brings Data Security to Network Appliances Built on Intel® Technologies

The number of branch office workers is growing, driving demand for virtualized network appliances matching specific requirements. AAEON's Intel-based network appliances provide multifaceted solutions for industrial sites and offices of all sizes

With a hybrid approach to remote work now commonplace across the world, remote offices – large and small – are accommodating an increased number of hybrid workers in addition to their full-time branch office staff. This is driving a need for secure data networks, as these users typically have less IT support, which can lead to issues such as unpatched laptops, mobile phones, and platform vulnerability due to a lower level of network and device security.

This trend coincides with the adoption of cloud services requiring new network access models. Traditional wide-area network (WAN) connections to regional or national headquarters need to be augmented with direct connections to the internet to avoid application latency that can make the user experience difficult.

All told, these trends create four challenges for enterprises:

Challenge 1 - WAN Connectivity

Broadly speaking, connecting branch office users to corporate resources and the internet via a WAN solution comes with higher costs. One reason is that voice, networking, security, and other systems rely on a decentralized collection of hardware appliances that creates a heterogeneous and complex operating environment.

The current trend for these networks is to replace legacy systems with software-defined wide area network (SD-WAN) software running on virtualized white box appliances. With today's Intel® Architecture Processors, a single branch office server can consolidate the functions of all traditionally required standalone appliances, while offering remote deployment and updates using a single, centralized management interface.

Challenge 2 - WAN Connection Prioritization

Traditional corporate WANs were designed with a high-speed link to regional headquarters for access to intranets, databases, and other corporate resources. This architecture comes with very high latency when accessing cloud services due to many branch offices sourcing their own local broadband connections. Consequently, data prioritization issues arose, with some data not optimized or prioritized in accordance with organizational needs. SD-WAN is a suitable resolution for this issue as it can provide data security and prioritization across multiple WAN and broadband connections, while also limiting latency.

Challenge 3 - Network Security

Branch offices have unique security threats and need HQ-level or better data safeguards while still remaining cost-effective. Users constantly face new threats to their data, which requires the flexibility to continually adapt security systems to protect against new threats. To combat this, network security functions such as firewall, VPN, and ZTNA can be deployed virtually along with other applications via the use of a virtualized server.

Challenge 4 - Faster Data Rates

Branch office network managers using traditional network appliances find it hard to keep up with increases in network throughput. These systems typically have fixed networking ports that become obsolete if the branch office moves to a higher speed network. Virtualized servers, however, can have modular network connectivity that allows for upgrades to network connectivity.

Given these challenges, many network managers are looking to deploy virtualized white box appliances with the right combination of security, performance, software and flexibility. AAEON, an Intel® Network Builders Titanium Tier member, offers a wide range of white box solutions that deliver edge performance with value added security, SD-WAN and security service edge (SSE) capabilities.

AAEON Offers a Comprehensive Range of Network Appliances

AAEON's range of network appliances offer solutions for a variety of settings (see Figure 1), from compact desktop models to server boards that can be customized for complex, demanding, high-volume applications.
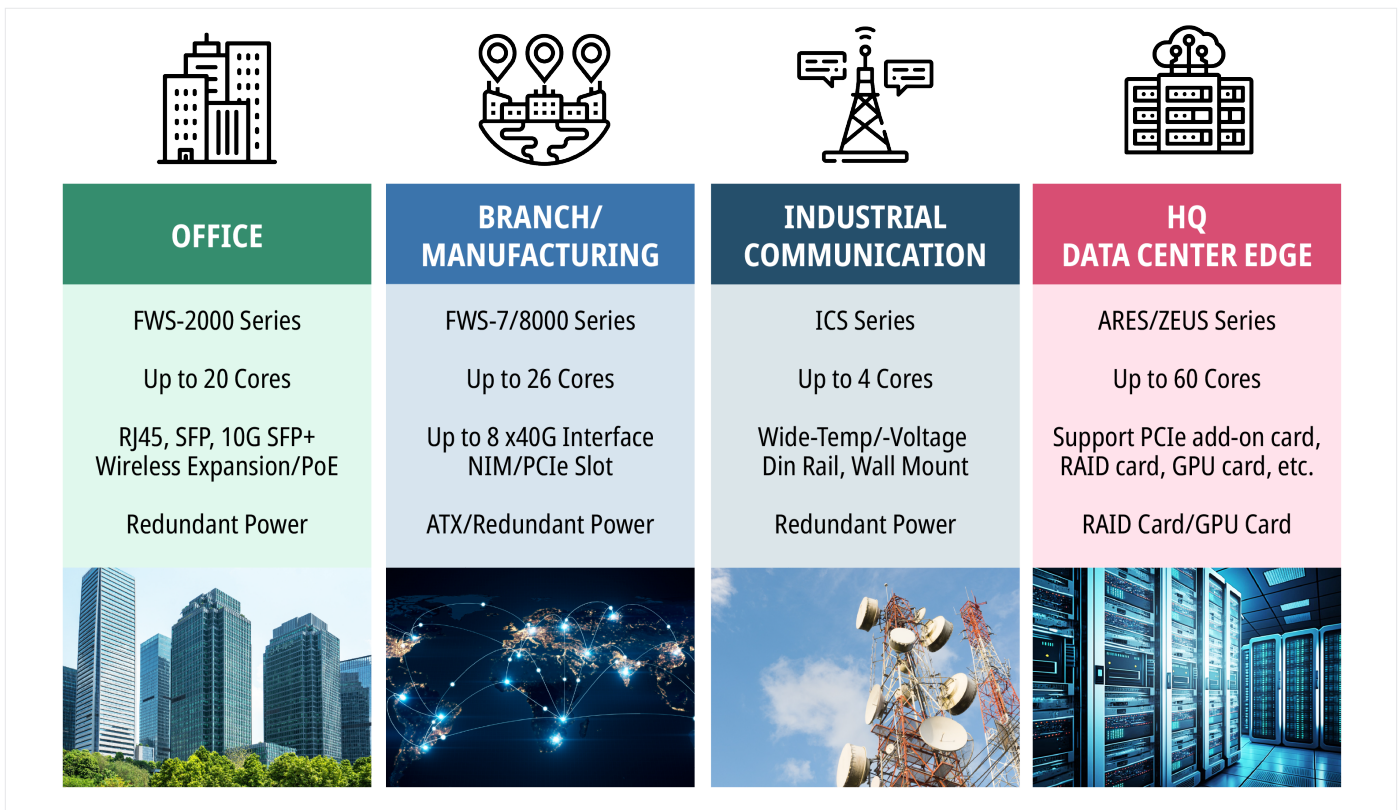
OFFICE	BRANCH/ MANUFACTURING	INDUSTRIAL COMMUNICATION	HQ DATA CENTER EDGE
FWS-2000 Series	FWS-7/8000 Series	ICS Series	ARES/ZEUS Series
Up to 20 Cores	Up to 26 Cores	Up to 4 Cores	Up to 60 Cores
RJ45, SFP, 10G SFP+ Wireless Expansion/PoE	Up to 8 x40G Interface NIM/PCIe Slot	Wide-Temp/-Voltage Din Rail, Wall Mount	Support PCIe add-on card, RAID card, GPU card, etc.
Redundant Power	ATX/Redundant Power	Redundant Power	RAID Card/GPU Card

Figure 1. AAEON products are optimized for a range of applications.

Desktop Network Appliances for Remote Offices

The AAEON desktop network appliance family (see Table 1) contains three network appliances designed for remote access networks catering to branch offices. These appliances use low-power, high performance Intel Atom® processors, including those from the Intel Atom® processors C3000 Series and Intel Atom® processor x7000E Series.

These products are designed for universal customer premises equipment (uCPE) applications such as a secure wireless gateway, SD-WAN, intrusion protection system (IPS), or WAN optimization. Some models feature built-in Intel® QuickAssist Technology (Intel® QAT) that accelerates cryptographic ciphers, hashes, public key cryptography and compression and decompression. Other devices provide Intel® Crypto Acceleration that accelerates cryptography and compression processing.

AAEON's desktop network appliances are equipped with a variety of wired connectivity ports ranging from 1GbE to 10GbE, while some contain expansion features to accommodate high-speed wireless networking such as Wi-Fi, 4G LTE or 5G. Selected models are certified for use with flexiWAN, a leading open-source SD-WAN software that offers a comprehensive, centrally managed open source SD-WAN framework.

Desktop Model	CPU Platform	flexiWAN-Certified	Intel® QAT	Connectivity Interface
FWS-2365	Intel Atom® processor C3000 Series	✓	✓	• 10GbE SFP+ x 4 • Up to GbE x 6 • Includes 3 wireless expansion modules for Wi-Fi, 4G, and 5G
FWS-2290	Intel® Processor N-series			• 2.5GbE x 4 • Includes 2 wireless expansion modules for Wi-Fi, 4G, and 5G
FWS-2370	Intel Atom® C Processor Series / Intel Atom® P Processor Series		✓	• 2.5GbE x 4 • GbE x 4 • 10GbE SFP+ x 4 • Includes 3 wireless expansion modules for Wi-Fi, 4G LTE, and 5G

Table 1. AAEON Desktop Network Appliances.

Industrial-Grade Network Appliance – for Manufacturing Applications

For manufacturing facilities that need secure connectivity to the cloud, AAEON offers the ICS-6280 (see Table 2). This DIN rail mountable appliance is ruggedized to operate in a wide temperature range of -40°C to 75°C with a wide 9Vdc ~ 48Vdc voltage range. The system is powered by Intel Atom processor x6000 Series to reliably support remote device management technology.

The ICS-6280 contains dense I/O equipped with two ESD-protected COM ports for RS-232/422/485, four GbE LAN ports with LAN bypass, and wireless network support. The ICS-6280 also offers added security software for next-generation firewall (NGFW) or unified threat management (UTM).

Industrial-Grade Model	CPU	flexiWAN-Certified	Intel® QAT	Connectivity Interface
ICS-6280	Intel Atom® processor x6000 Series		✓	• GbE x 4 • Includes 1 wireless expansion module for Wi-Fi and 4G LTE

Table 2. AAEON Industrial-Grade Network Appliance.

Rackmount Network Appliance – for Network Gateways

The FWS-7541 and FWS-7851 (Table 3) are full-featured 1U rackmount network appliances powered by the Intel® Xeon® D and 13th Gen Intel® Core™ processor platforms, respectively.

The FWS-7541 can power a wide range of uCPE applications and supports Wi-Fi, 4G LTE, and 5G modules. It can also be deployed as a network gateway and is certified compatible with flexiWAN's open-source SD-WAN architecture. This server also features encryption acceleration via support for Intel QAT. The system features expandable high-throughput networking with 12 RJ-45 ports supporting Intel® Ethernet Controller I350-AM4 and four 10G SFP+ ports, alongside M.2 E and B-Key slots for 5G and Wi-Fi modules. Further, the optional IPMI support in the FWS-7541 allows for the remote monitoring and control of hardware, firmware and software in cross-OS environments.

Rackmount Model	CPU	flexiWAN-Certified	Intel® QAT	Connectivity Interface
FWS-7541	Intel® Xeon® D processors	✓	✓	▪ 10GbE SFP+ x 4 ▪ GbE x 12 ▪ Includes 2 wireless expansion modules for Wi-Fi, 4G LTE, and 5G
FWS-7851	13th Gen Intel® Core™ processors	✓		▪ 10 x 2.5GbE ports ▪ 2 x 1GbE SFP ▪ Supports optional 2 10GbE SFP+ & redundant PSU

Table 3. Rackmount Network Appliance.

The FWS-7851 features ten RJ-45 ports supporting 2.5GbE Intel® Ethernet Controller I226-V, two GbE SFP ports, along with the option of four 10GbE SFP+ ports. The optional redundant PSU kit is affixed to the outside of the system's chassis and offers a route to flexible redundant PSU functionality by adopting an external second 1U ATX PSU within the PSU kit. The FWS-7851 is the perfect appliance with which to build universal threat management (UTM) solutions, with its exceptional processing power of 13th Gen Intel Core processor and multifaceted connectivity able to handle even the most demanding workloads.

Server Board for Customized Applications

The AAEON ARES-EAG0 (Table 4) server board offers the data center server performance of 4th and 5th Gen Intel® Xeon® Scalable processors in a compact form factor designed for building large-scale industrial networking applications.

The board hosts six PCIe Gen 5 slots. These can be used for up to four GPUs to enhance the performance of demanding applications such as edge AI servers, AI-based visual inspection, and frame grabbers.
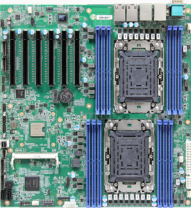
Server Board Model	CPU	flexiWAN-Certified	Intel® QAT	Connectivity Interface
ARES-EAG0	4th and 5th Gen Intel® Xeon® Scalable processors		✓	▪ GbE x 1 ▪ 10G x 2 ▪ PCIe x 6

Table 4. Server Board Model ARES-EAG0.

Flexible storage options come from up to eight SATA 6Gb/s drives with RAID 0, 1, 5, 10 support, as well as an M.2 2280 M-Key for NVMe. The ARES-WHI0 also supports up to 192GB of DDR4 memory via six R-DIMM slots.

Intel Brings Performance, Data Security Features

AAEON has chosen Intel processor platforms as the foundation for its network appliance range due to the unique combination of high-performance, power-efficiency, conducive features, and product assurance that they offer. Specific CPUs chosen for AAEON's network appliance range include:

13th Gen Intel® Core™ processors

Built to support high-speed networking and heavy compute workloads, the 13th Gen Intel Core processor provides a greater number of performance cores with substantially elevated single-core frequency to reduce latency. The new generation also has a variety of features added as part of the Intel vPro® Platform, such as Intel® Hardware Shield for greater firmware security, such as comprehensive transient key-based encryption through features such as Intel® Total Memory Encryption (Intel® TME).

4th Gen Intel® Xeon® Scalable processors

This data center-class CPU platform delivers unparalleled scale and performance for compute, storage, network, and security applications. Optimized performance via higher core counts, increased clock speeds, and improved architecture and security features such as Intel® Software Guard Extensions (Intel® SGX) as well as integrated accelerators such as Intel QAT, Intel® Dynamic Load Balancer (Intel® DLB), Intel® Data Streaming Accelerator (Intel® DSA) provide substantial benefits to the handling of data center and edge workloads.

5th Gen Intel® Xeon® Scalable processors

5th Gen Intel Xeon Scalable processors offer significant compute performance increases while also improving average performance-per-watt efficiency. The CPUs support DDR5 memory, PCIe 5.0 I/O, and Compute Express Link (CXL 1.1). These processors are software and platform compatible with 4th Gen Intel Xeon Scalable processors, minimizing testing and validation when deploying new systems and instances. Refreshing legacy servers with 5th Gen Intel Xeon Scalable processors can result in incredible efficiency while enabling advanced use cases such as additional confidential computing capabilities from Intel® Trust Domain Extensions (Intel® TDX).

Intel® processor N-series / Intel Atom® processor x7000E Series

Both the Intel processor N-series and the Intel Atom processor x7000E Series utilize the same CPU microarchitecture from the latest Intel 7 process but offer different features. Intel processor N-97 is a four-core processor that offers robust 2.0 MHz clock speed. The chip features Intel's innovative efficient cores (E-cores) and features a low TDP of 12 Watts. The processor also features an integrated GPU with up to 24 execution units (EUs) for data offload of AI, visual processing and other compute-centric use cases.

There are three models in the Intel Atom processor x7000E Series offering either two or four core performance and a clock speed of either 1.0Ghz or 1.7 GHz. These low-powered processors feature a TDP of between 6 and 12 Watts. They also come with an integrated GPU that delivers either 16 or 24 execution units (EU) of throughput.

This CPU family (which also includes the Intel Core i3-N305 platform give users crucial benefits to networking applications, such as Intel® Streaming SIMD Extensions (Intel® SSE) like Intel® SSE4.1 and Intel® SSE4.2, along with Intel® Advanced Vector Extensions (Intel® AVX) such as Intel AVX2.

Intel Atom® processor C3000 Series

A system-on-chip (SoC)-based CPU product family that delivers efficient operation for servers located in smaller spaces at the edge. These CPUs are designed for a variety of light scale-out workloads that require very low power, high core density, and low heat generation. Applications include network routers, switches, storage, security appliances, and more.

Intel® Xeon® D processor

Intel Xeon D processors deliver workload optimized performance in space and power constrained environments, from data centers to the edge. These innovative, system-on-chip processors support high-density, single-socket networking, storage, and edge-cloud computing solutions with a range of integrated security, network, and acceleration capabilities.

A further benefit to utilizing these processors is the additional encryption and virtualization technologies they offer.

Cryptography Performance

Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) are an additional set of instructions that enable fast and secure data encryption and decryption. For 4th and 5th Gen Intel Xeon Scalable processors, Intel AVX-512 enhance the performance of compute-intensive cryptography workloads, expanding on the groundwork laid by previous Intel® Instruction Set Extensions Technology.

These optimized instruction sets not only bolster the compute strength required for cryptographic tasks but are also integral to software acceleration libraries such as Intel® Integrated Performance Primitives (Intel® IPP), SM2 cryptographic algorithm support, and the optimized software implementations provided by Intel® Multi-Buffer Crypto for IPSec.

In heavy encryption applications, where it makes sense to accelerate that traffic outside the CPU, Intel QAT offers a hardware-based encryption/decryption and compression acceleration to provide additional performance.

In the 13th Generation Intel Core processors and Intel Atom x6000E Series, x7000E Series and later-generation processors, cryptographic tasks are handled by the CPU cores themselves using Intel Crypto Acceleration and Intel AVX2 instructions.

Virtualization Performance

Intel architecture CPUs incorporate specialized technology aimed at enhancing virtualization performance. Among these advancements is Intel® Virtualization Technology (Intel® VT), which facilitates the sharing of a common pool of resources among multiple workloads. Additionally, single root I/O virtualization (SR-IOV) is supported, which enables a direct connection between virtual network functions and physical network functions. This integration bolsters virtualization capabilities while optimizing resource use and enhancing overall system efficiency. Through these features, Intel CPUs empower robust virtualization solutions that efficiently manage diverse workloads while maintaining high performance and reliability.

Conclusion

The world of work is changing, and with it comes growth in the demand for remote office networking solutions. This change means an increased need for virtualized network appliances that can integrate the full range of network functions on a single platform – reducing network management and complexity. AAEON utilizes multiple Intel architecture-based products to provide a range of network appliances, ranging from compact desktop white box solutions to rackmount and server products to meet the remote access needs of enterprises.
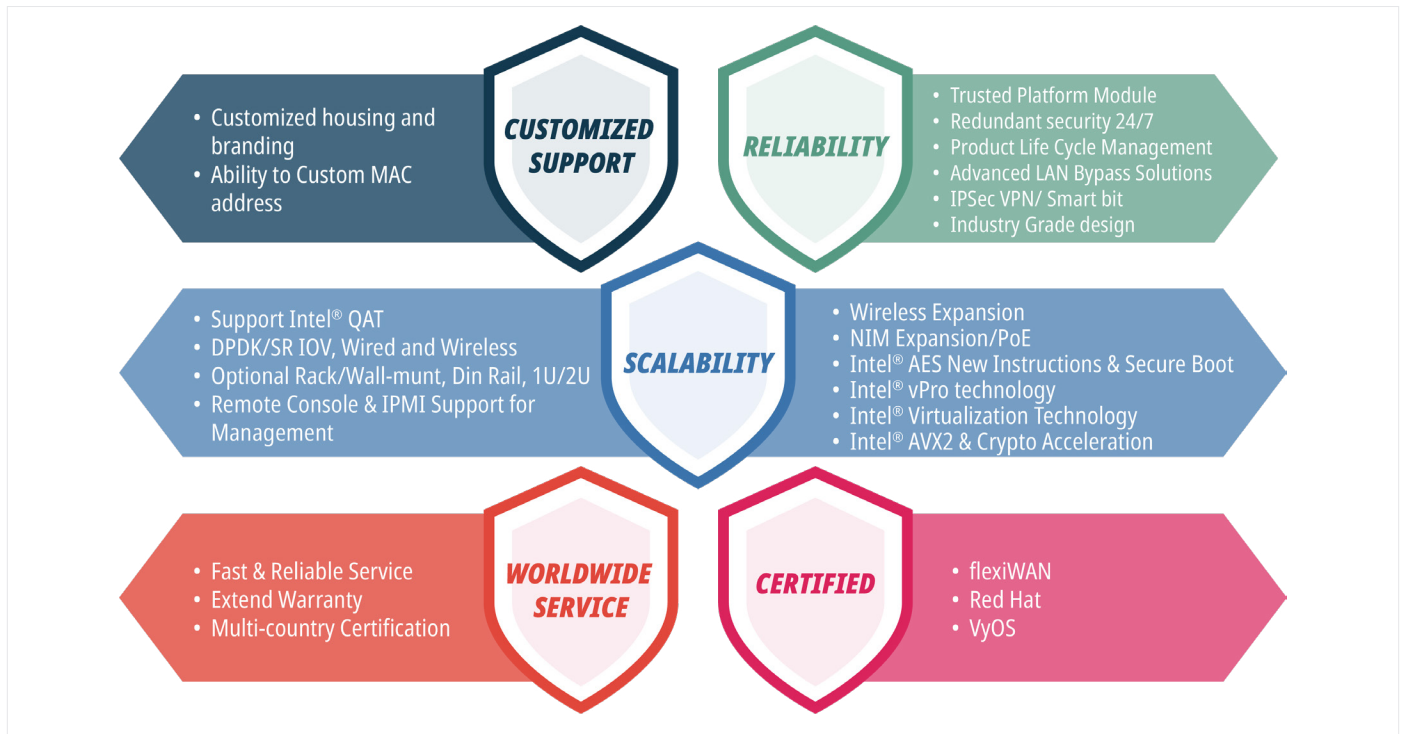
Figure 2. AAEON offers Intel architecture-based systems and is known for customized support, reliability, worldwide service, and technology certifications.

Learn More

AAEON Desktop Network Appliances

FWS-2365

FWS-2370

FWS-2290

Industrial-Grade Network Appliances

ICS-6280

Rackmount Network Appliances

FWS-7851

AAEON Server Board

ARES-WHI0

Intel® Network Builders

Intel Atom® processor x7000E Series

Intel Atom® C3000 processor Series

Intel® Xeon® D processors

4th Gen Intel® Xeon® Scalable processors

5th Gen Intel® Xeon® Scalable processors

13th Gen Intel® Core™ processor family

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